

**Contraindications**

Chondrocalcinosis

1. Progressive tibiofemoral arthritis
2. Severe coronal deformity [unless corrected surgically to  $<8^\circ$  in Valgus and  $<5^\circ$  in varus]
3. In the sagittal plane,  $<120^\circ$  of free flexion with  $>10^\circ$  of flexion contracture
4. Patella baja from quadriceps muscle atrophy or patellar tendon scarring
5. A general consensus is that patellofemoral arthroplasty should be avoided in obese patients to prevent overloading the implant.

**Advantages**

Retention of normal tibiofemoral kinematics

Intact ligaments and menisci

There is no consensus that cruciate deficiency or previous meniscectomy causes poor outcomes.

**Biomechanics**

Experimental models have shown that PFJ joint reaction forces are up to 3.3 times body weight at  $60^\circ$  of knee flexion and 7.8 times body weight at  $130^\circ$

**Clinical Evaluation**

Anterior or retropatellar knee pain

Exacerbated with activities that preferentially load the patellofemoral articulation.

These provocative activities usually involve ascending or descending stairs, walking on uneven surfaces, and kneeling or squatting.

Patients often describe preferring to sit with the legs extended rather than flexed.

Long car rides or prolonged sitting

Inquire about subluxation or dislocation of patella

**Physical Examination**

1. Alignment
2. Limb length
3. Quadriceps muscle atrophy
4. The Q angle and patellar tracking ( $>15^\circ$  in men and  $>20^\circ$  in women)
5. Signs of patellar instability (lateral patellar subluxation occurs in the terminal  $20^\circ$  of extension)
6. The J sign are indicative of patellar instability
7. Excessive femoral internal torsion or tibial external torsion can lead to malalignment as well. A planovalgus

foot can be associated with patellar maltracking

8. The patellar grind.

Primary PFA includes Outer-bridge type-IV chondromalacia of the patella and/or trochlea.

Posttraumatic PFA

The progression of tibiofemoral arthritis is the most common cause of revision to total knee arthroplasty, emphasizing the fact that tibiofemoral arthritis is a principal contraindication to patellofemoral arthroplasty.

### **Preoperative Imaging**

Weight-bearing AP and lateral X ray of the knee [T-F Arthritis]

Lateral radiographs: arthritic patellofemoral changes are visible.

Patella baja should be corrected before patellofemoral arthroplasty.

Standing PA 45° flexion (Rosenberg views) are used to assess the extent of abnormality of the posterior femoral condyle.

Axial radiographs demonstrate the extent of patellofemoral arthritis, trochlear dysplasia, and patellar tilt.

Full-length standing radiographs are useful for evaluating mechanical alignment of the entire limb

Computed tomography is used to evaluate posttraumatic osseous architecture, rotational abnormalities, and trochlear dysplasia, but has little role in assessing patellofemoral arthritis.

MRI with use of delayed gad-enhanced for cartilage (dGEMRIC) and T1rho are being studied.

### **Advantages of Patellofemoral Arthroplasty**

1. Conserves more bone
2. Biomechanics of TF joint is preserved
3. Less extensive, less blood loss and less rehabilitation
4. Outcome of subsequent TKA is similar to primary TKA

### **Designs**

The evolution of the implant design has led to increased patient satisfaction. Design attributes that have improved results include onlay prosthetic design with a broad trochlear surface, a valgus tracking angle, and a congruous articulation throughout the range of motion. An onlay design removes the entire trochlea and eliminates the need to set the prosthesis flush with the remaining trochlear bone, which can be technically challenging. The prosthesis should extend proximal enough to prevent catching, snapping, or popping of the patellar component during knee flexion. The trochlear component should allow free movement of the patella in extension and should also be broad enough to cover the entire medial and lateral aspects of the anterior distal end of the femur without overhang

### Alternative Treatment for PFA

1. Activity modification,
2. NSAID
3. Weight reduction,
4. Physical therapy,
5. Taping and bracing,
6. Periodic intraarticular corticosteroid injection
7. Hyaluran: viscosupplementation

Alternative operative approaches that have been used to treat isolated patellofemoral arthritis include arthroscopic debridement with or without lateral release, chondroplasty, autologous osteochondral chondrocyte implantation, osteochondral allografts, lateral facetectomy, anteromedial tibial tubercle transfer, patellectomy, and total knee arthroplasty.

On the basis of moderate quality evidence, there was a strong recommendation against the use of arthroscopy with debridement. In contrast, there was a weak recommendation for the use of osteochondral allografts and partial lateral facetectomy.

### Patellofemoral Arthroplasty Outcomes

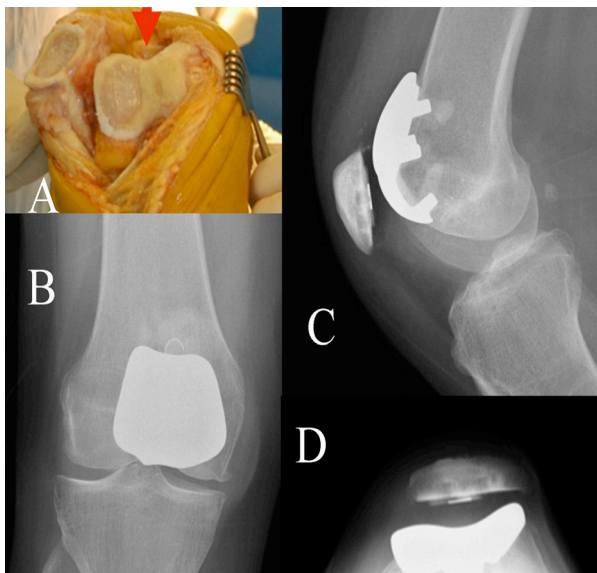
Good to excellent results at three to seventeen years of follow-up for 66% to 100%

Soft-tissue realignments and tibial tubercle transfers were done concomitantly to improve patellar tracking.

Revision to total knee arthroplasty was required in 3.6% of the patients because of progression of tibiofemoral arthritis.

Leadbetter reported the results of a multicenter study with 79 PFA in seventy patients with a mean follow-up of three years (range, two to six years). 90% functioned without pain in daily activities and stair climbing, 84% achieved Knee Society Scores of >80 points.

There were 13 clinical failures: six knees were revised to TKA.



Dahm compared 23 PFA with 22 TKA at the Mayo clinic. He concluded that PFA yields clinical outcomes comparable with those of total knee arthroplasty as treatment for isolated PFarthritis.

### **Patellofemoral Arthroplasty Complications**

1. Implant or technique-related issues and include malalignment and maltracking.
2. Late problems are loosening and/or wear of the patellar component, loosening of the trochlear component
3. Development of tibiofemoral disease.
4. Instability.

Newer designs are more accommodating and have reduced these problems. Malposition of the implant also can cause patellar catching and instability. Placing the implant in flexion can lead to catching of the patellar component on initiation of flexion. Malrotation of the trochlea or a laterally placed patellar component can cause subluxation or dislocation with recurrent instability. A trochlear component that is too large may irritate the peripatellar retinaculum.

With long-term outcome data up to 15-20 years now available, the development of femorotibial osteoarthritis has been determined to be the most common reason for failure and conversion to total knee arthroplasty.

Tibiofemoral arthritis was observed in 45% of knees and resulted in conversion to total knee arthroplasty in 13% in the study by van Jonbergen. They concluded that patellofemoral arthroplasty does not have a negative effect on the outcome of TKA.

### **Surgical Pearls and Pitfalls**

1. Care must be taken not to injure the anterior horn of the medial meniscus or the anterior transverse meniscal ligament
2. The medial and lateral compartments of the knee should be carefully inspected to ensure that the patient does not have articular cartilage changes that would preclude PFA.
3. Most implant systems involve an anterior trochlear femoral cutting block attachment, which is comparable with the anterior cut during a total knee arthroplasty. If the patient has a hypoplastic trochlear groove, flexing the cutting block slightly will allow a deeper cut and trochlear groove without overstuffing the anterior compartment of the knee. When seating a trial implant to determine the appropriate size of the femoral-trochlear component, adequate coverage should be ensured and any overhanging edge of the femoral component should be avoided.

With a symmetric trochlear implant, the surgeon needs to be aware that the normal trochlear groove lies approximately 7° to 16° lateral from the joint line.

The patellar resection is carried out just as for a primary total knee arthroplasty, with a medialized button placement to mimic the peak height of the native patella and allow symmetric tracking.

### **Overview**

The current generation of patellofemoral arthroplasty implant designs, when used in properly selected patients on the basis of clear history, physical, and radiographic criteria, provides a sound option for the treatment of

isolated osteoarthritis of the patellofemoral joint. Determining which patients may not be good candidates is difficult but is essential to ensure long term survivorship and patient satisfaction.

Correcting any patellar maltracking prior to or at the time of patellofemoral arthroplasty is mandatory, and patellofemoral arthroplasty should never be used alone to treat patellar instability.

### **References**

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